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M

Development (1948) Department.

Ms. SERIES.

G.O. No. 3606

Dated 7th July 1948.

[Despatch Abstract.]

Agriculture - Indian Central Sugar Committee - Resume of work carried out on sugarcane in Madras Province - Forwarded to the Committee - Papers recorded.

No.F. 91/48-1052

INDIAN CENTRAL SUGARCANE COMMITTEE.

No.3, Pusa Road, New Delhi-
Dated, the 21st April 1948

From:

Sri R. D. Bose,
Secretary

To

All Provincial and Constituent States Governments
in the Dominion of India.

Sir,

I am directed to inform you that the Indian Central Sugarcane Committee proposes to publish a detailed account of the work done in India on research and development of sugarcane and to request you kindly to furnish this office by the 1st of June, 1948, a resume of the important work undertaken by your Department of Agriculture and the research schemes under it, showing what advances, if any, have been made, in order to increase the yield of sugarcane in your Province/State since subsidies were made to your Government by (i) the Indian Council of Agricultural Research, and (ii) the Indian Central Sugarcane Committee.

2. Details, showing the varieties evolved or recommended for general multiplication, manufial schedules, plant protection irrigation and other facilities granted and the increases in (a) acreage, and (b) production per acre, may kindly be given. An estimate of the total subsidy granted for this purpose by (i) the Indian Council of Agricultural Research, and (ii) the Indian Central Sugarcane Committee, and a list of publications issued during this period may also kindly be furnished.

3. As it is proposed to publish this information for apprising the country, in general, and the cultivator, in particular, of the improvements effected for increasing and improving sugarcane cultivation, it is requested that a concise but comprehensive account, in popular language, be supplied to this office in this connection.

Kindly acknowledge receipt and arrange to supply the information within the specific date.

I have the honour to be, Sir
Your most obedient servant,
Sd/ R.D. Bose.
Secretary
Development Department

Endorsement No.46962-A/48-1, dated 29-4-1948.

Communicated to the Director of Agriculture.

He is requested to furnish the resume required by the Indian Central Sugarcane Committee in triplicate before 20-5-1948.

Sd/ ** **
** **

To the Director of Agriculture (with a copy of pl. ante).

p.t.o.

Government of Madras
Development Department

Letter No.46962-A II/48-2.

From

The Secretary to Government,
Development Department

To

The Secretary,
Indian Central Sugarcane Committee
NEW DELHI

Dated Fort St. George the 29th April 1948

Sir,

Agriculture - Indian Central Sugarcane Committee - Resume of important work undertaken on sugarcane by the Agricultural Department

Your letter No.F.91/48-1052, dated 21st April 1948

I am to acknowledge the receipt of your letter cited.

Yours faithfully

AGRICULTURAL DEPARTMENT

From
M.S. Sivaraman, Esq., I.C.S.,
Director of Agriculture.
Chepauk, Madras

The Secretary to Government,
Development Department,
Fort St. George.

Letter No.D1-476/48, dated 29-5-1948.

Sir,

Sugarcane - Resume of work carried out on Sugarcane in Madras Presidency.

Government Endorsement No.46962-A.II/48-1, dated 19-4-1948.

I submit (in triplicate) the resume of work on sugarcane carried out in the Madras Presidency. The work done in connection with the sugarcane Pests will follow.

Sd/ C.R. Srinivasa Ayyangar,
for Director of Agriculture.

p.t.o.

RESUME OF WORK ON SUGARCANE CARRIED OUT IN THE MADRAS PRESIDENCY WITH SUBSIDY FROM INDIAN COUNCIL OF AGRICULTURAL RESEARCH AND INDIAN CENTRAL SUGARCANE COMMITTEE.

INTRODUCTION:

Sugarcane work in this province was started as early as 1902 at Samalkot, but financial aid in this respect was offered by the Indian Council of Agricultural Research in 1933-34 at Anakapalle (Vizag. Dt.) and in 1934-35 at Gudiyattam (North Arcot Dt.). The scheme financed by this Council was only on a small scale and in 1946, the Indian Central Sugarcane Committee stepped in to finance a comprehensive scheme (as per details furnished below), in research and development.

Sugarcane Research Station, Gudiyattam.

Details of expenditure incurred out of the funds from the Indian Council of Agricultural Research and the Indian Central Sugarcane Committee are given below:-

1935-36	Rs. 27,857	
36-37	13,618	Whole expenditure financed
37-38	20,970	by the Indian Council of
38-39	19,414	Agricultural Research.
39-40	14,248	
40-41	14,487	
41-42	14,943	
1942-43	6,577	Pay and allowances alone
43-44	5,957	do
44-45	5,635	do
45-46	6,818	Pay and allowance by the
46-47	16,878	sugarcane Committee.

Sugarcane Research Station, Anakapalle.

At Anakapalle the subsidy granted was only to maintain two Assistants, a fieldman and a clerk.

The main programme of work consisted in selecting high yielding types of cane suitable to the different tracts in the Province and also to increase the yield and reduce the cost of cultivation by cultural and manurial trials.

Resume of work done:

(1) Varietal: Sugarcane seedling types were received every year from the Indian Sugarcane breeding station, Coimbatore and elsewhere, at the Sugarcane Research Station, Anakapalle and Gudivattam

These were multiplied in these farms in the first year of their receipt, and studied thoroughly for all their economic characters in the subsequent three years in varietal study plots. On the basis of their juice analysis and growth vigour ~~maturing types suitable for crushing in that particular season~~ these varieties are classified as "early", "midseason" and "late" maturing types suitable for crushing in that particular season. Promising varieties are tested for their yield in the preliminary yield trials, and those promising in this trial are taken to main yield trials and tried for three successive seasons, and best ones from this trial are selected and released for cultivation in the district. Thus it takes six to seven years before a variety received from Coimbatore is released to the ryot.

Prior to 1933, J. 247, Purple Mauritius, Striped Mauritius, and B. 208, were the popular varieties in the Province. Later C.O. 213 came into the field and was the most popular type for some time, but with the introduction of

Co.419 during the year 1936, the latter almost ousted all other types. Though this variety has certain drawbacks such as brittleness of stalk, tendency to lodge, and susceptibility to smut, its capacity/give heavy tonnage under varied soil and climatic conditions has outweighed all its disadvantages

The comparative yield figures in the trials conducted at Sugarcane Research Station, Anakapalle during the years 1937-38 to 1939-40; are furnished below to bring out the superiority of Co. 419. It is noted that Co. 419 recorded an average yield of 54.77 tons of millable cane per acre, and jaggery recovery of 6.4 tons.

S.No.	Variety	Yield in tons per acre (Average for three years).	Percentage of jaggery recovery on cane weight.	Weight of jaggery in tons per acre.
1.	J. 247	33.49	10.15	3.399
2.	Co. 213	37.79	9.42	3.560
3.	Co. 281	27.88	10.62	2.961
4.	Co. 313	34.01	9.68	3.292
5.	Co. 407	36.29	9.40	3.411
6.	Co. 411	41.25	9.70	4.001
7.	Co. 419	54.77	11.74	6.423
8.	Co. 421	42.41	10.04	4.258
9.	Co. 508	34.34	11.22	3.853
10.	POJ.2878	33.52	11.29	3.784

Five promising varieties (viz.) Co. 408, Co. 419, POJ 2878 striped Mauritius and J. 247 were tested for their yield for three consecutive seasons 1936-37 to 1938-39 at the Sugarcane Research Station, Gudiyattam. Co. 419 was outstandingly the best variety with an acre ~~of~~ yield of 60 tons of cane and ~~of~~ 7.17 tons of jaggery, as against 36.25 tons of cane and 23.27 tons of cane per acre in favour of J. 247 and striped Mauritius respectively.

Sugar factories to be economical must prolong their crushing period as long as possible. The usual harvesting season for sugarcane is February-March. In order to prolong the crushing season of the sugar factories, varieties ~~of~~ suitable for crushing early in the season (i.e.) November-December and late in April - May were selected at the two Sugarcane Research Station Anakapalle and Gudiyattam

At Anakapalle, Co. 527 was outstanding among the early varieties tried during the years 1940-41 to 1942-43. This variety records about 16 per cent increase and about 85 per cent purity by December and in later months improves upon the juice quality and maintains without deterioration till March-April. This variety is recommended as an early type in the factory areas to enable the factory to start crushing earlier than what is possible with a single variety like Co. 419. The yield data from the comparative yield trials conducted on the farm during the years 1940-41 to 1942-43 are furnished below:--

S.No.	Variety	Yield of cane in tons per acre (average for 3 years)	Percentage of jaggery recovery on cane weight	Weight of jaggery in tons per acre.
1.	Co. 527	43.34	10.62	4.603
2.	Co. 523	42.11	9.84	4.144
3.	Co. 313 (Control)	34.55	10.05	3.472
4.	Co. 508	33.74	10.87	3.668
5.	Co. 270	34.33	9.82	3.371

At Gudiyattam Co. 421 was outstanding an early cane with an acre yield of 30.25 tons of millable cane in an yield trial conducted during the ~~xxx~~ years 1939-42, with six promising early varieties (viz.) Co. 313 (Central) Co. 407. Co. 414. Co. 421, 8 and POJ.-2878

Later trials with other promising early varieties (viz.) (Control), Co. 449, Co. 453, Co. 455, Co. 540 and Co. 545

during the years 1942-45 showed that Co. 449 to be the best variety with 33.81 tons of cane per acre as against Control Co.421 with 25.83 tons. This variety was released into the district for cultivation.

Among the selections for mid-season at Anakapalle Co. 421 and Co. 449 were promising but Co. 421 has not made such headway into the district due to heavy pith formation. Co. 449 has also not spread due to lower tonnage than Co. 419 and also due to the factories not paying any premia for such early and rich but shy yielders. During the last two seasons Co. 467, Co. 46[illegible] and Co. 475 467 are found promising as mid-season canes and of these Co. 475 is promising in respect of juice and jaggery quality. The yield figures of the varieties tried from 1940-41 to 1942-43 are furnished below:

Serial Number	Variety	Yield of cane in tons per acre.	Yield of jaggery in tons per acre
1	Co. 421	37.26	3.830
2	Co. 449	41.57	5.034
3	Co. 451	34.11	3.954
4	Co. 542	40.26	4.443
5	Co. 545	38.73	3.877

At Gudiyattam six promissing mid-season maturing varieties (viz.) Co. 467, Co. 419, Co. 449, Co. 469, Co. 538, Co. 545 were tested for their yield in 1946-47. The variety Co. 467 recorded the maximum yield of 39.25 tons of cane per acre and this variety is released into the district for trial.

Among varieties tried for crushing late in the season Co. 419 was the best at Anakapalle. In an yield trial conductor for three years during the years 1943-44 to 1945-46 with five promising late varieties (viz.) Co. 331, Co. [illegible] 419, Co. 444, Co. 538, Co. 544, Co. 419 was most promising with an acre yield of 39.13 tons of millable cane and 4.504 tons of jaggery.

At Gudiyattam also Co. 419 was found to be the best yielder in late yield trial with five other late types (viz.) Co. 331, Co. 349, Co. 411, Co. 413, Co. 417 for three seasons (1940-1943)

Another series of yield trial with a fresh set of varities (viz.) Co. 419 (control); Co. 449, Co. 452, Co. 523, Co. 535 and Co. 548 was laid out during the years 1943-46. The results showed that Co. 449 was the best yielder with 35.55 tons of cane and 4.44 tons of jaggery per acre.

(ii) Manurial: Nitrogen is the most important of the elements for sugarcane as the response to it is such greater than either potash or phospheric acid or both. Results of unreplicated trials conducted prior to 1936 revealed that there was no advantage due to heavy application of either potash or phospheric acid.

Manurial experiment with graded dose of nitrogen for cane conducted at Anakapalle with Co. 419 variety for three years from 1943-44 to 1946-47 revealed that about 100 lbs. of nitrogen is optimum for the tract. Higher doses of nitrog[illegible] have shown a depressing effect on the juice quality. The yield date from this experiment are furnished below:

S.No.	Treatment	Yield of cane in tons per acre	Yield of jaggery in tons per acre
1.	0 lb N per acre	40.20	4.656
2.	50 lb N per acre	47.06	5.177
3.	100 lb N per acre	52.07	6.034
4.	150 lb N per acre	49.99	5.673
5.	200 lb N per acre	49.80	5.439
6.	250 lb N per acre	50.16	5.486

At Gudiyattam, a manurial experiment on the same lines as at Anakapalle was laid out with six levels of nitrogen 0lb. 50 lb., 100 lb., 158 lb., 200 lb., and 250 lb. as Groundnut cake were tried on Co. 419 over a basal dressing of 10 tons of Farm yard manure. Results of two years showed that 200 lb. Nitrogen gave significantly the highest yield of 52.54 tons of cane per acre. Application of more basal dressing of farm-yard manure was not of much avail and the treatment which received no concentrated manure was miserably poor in yield (22.58 tons).

A simple experiment to test the effect of phospheric / acid was laid out at Anakapalle and Gudiyattam by applying one cwt of super phosphate over a basal dressing of 5 tons of Farm yard manure and 100 lb. N per acre as Groundnut cake and Ammonia Sulphate in the ratio of 2:1. The results indicated that the addition of phosphate has no beneficial effect on the juice quality as also on the yield of cane.

At Gudiyattam an experiment to study the effect of planting intensively and poorly fertilised nursery crop under different manurial doses (viz.) 50 lb. N, 100 lb. N, and 150 lb. N in the main field was laid out during the years 1936-37 to 1938-39, with a view to see if the 'setts from intensively fertilised nursery crop can come up well with less dose of manure in the main field, and thus reduce the cost of manure. The results indicated that there was no significant differenc in yield between intensively and poorly fertilised seed crop though the crop from the former was better in germination and early vigour than that from the latter. Merely manuring the nursery crop and planting with less dose of manure in the main field was not of much avail. As sugarcane is a long duration crop, manuring the main field counted more than manuring the nursery as even the poorly fertilised seed crop when grown with normal dose of manure yielded as good as (35.45 tons) intensively fertilized crop with a similar dress of manure. (36.37 tons).

All the varieties under observation plots at Anakapalle and Gudiyattam till 1945 were raised under two levels of irrigation and manure (viz.) Normal and restricted. The treatment "Normal" received 100 lb. Nitrogen per acre and irrigations once a fortnight while the treatment "Restricted" received 50 lb. Nitrogen with half the number of irrigations. These trials indicated the fact that the restricted treatment while reducing the tonnage of cane per acre improved the juice quality in all the varieties by showing earlier ~~matury~~ maturity and higher ~~source~~ content and purity, while the results are reverse at Gudiyattam.

An experiment to study the ~~x~~ optimum time of application of manure was laid at, at Anakapalle, in 1946-47 and is now in the final stage of trial. Four times of applications are under test (viz.) 150 lb. 'N', (2/3 as Groundnut cake and 1/3 as Sulphate of Ammonia) applied all in one dose at the time of planting, (2) 150 lb. N ~~(xxx)~~ (2/3 as Groundnut cake and 1/3 as sulphate of Ammonia) all applied in one dose two months after planting. (3) 150 lbs. N (2/3 as Groundnut cake and 1/3 as sulphate of Ammonia) all applied in one dose four months after planting. (4) 150 lb. Nitrogen (2/3 as Groundnut cake and 1/3 as sulphate of Ammonia) half at the time of planting and the other half at the time of earthing up. The results of the experiment so far obtained, indicated that it is better to apply all the manure two months after planting or half at the time of planting and the other half at the time of earthing up, than applying the manure in full at the time of planting or four months after planting.

III. Cultural: Improvement in the Cultural practices in growing cane is also as much important as improvement of variety. A number of cultural experiments have been done at Anakapalle and Gudiyattam and the following are the improvements.

(i) Improvement of sugarcane seed material: Usually sugarcane is propagated by stem cuttings. In many places the top half of the cane is used for planting and this method is adopted where the planting and harvesting time synchronise, as the top setts out from the harvested crop cannot be preserved fo any length of time, where the harvesting and planting times differed a portion of the crop is left over and the whole canes are cut from this into setts and these are used as seed material. Here most of the bottom do not germinate well, while top immature setts germinate better. For this purpose sugarcane is short cropped by planting the crop in August and using the immature seed material for planting purposes

An experiment has laid out at Anakapalle to test the efficacy ~~efiency~~ of short-crop material over that of mature seed ~~material~~; indicated that short crop seed material when planted yielded an average 17.5 per cent more than the crop planted with mature seed material. The efficacy of planting short crop was well brought home to the ryots and it is usually planted by them where extensive areas are planted to this crop by ryots and where facilities for short crop also exist

(ii) Preservation of sugarcane seed material; Experiments regarding the preservation of sugarcane seed material have been conducted at Anakapalle with the following treatments viz. (1) Setts are heaped together and covered with trash and kept moist for periods of 15, 30 and 45 days (heap method) (2) Pitting whole canes with trash and preserving for 15, 30 and 45 days (North West Frontier method) (3) Bundles of setts planted erect in a puddle, covered with paddy straw and kept moist by watering frequently (Kurnool method). All these three methods were tested against the planting of short crop seed material as control. The experiment was conducted for three years from 1937-38 to 1939-40 with variety Co. 419. The results have shown that short crop seed material gave the highest yield followed by Heap method - 15 days.

(iii) Spacing - Spacing experiments conducted at Anakapalle to determine the optimum spacing required for planting of sugarcane indicated that a spacing of 4 links between rows is the best compared to 3 links and 5 links, spacings

(iv) Wrapping and propping: In this tract (Anakapalle) - the sugarcane crop is invariably wrapped and propped with bamboos to prevent it mainly from lodging. This item of operation is very costly and experiments were laid out with different treatments to reduce the cost of cultivation and at the same time to keep the crop erect without detriment to yield. Trials made with different methods of wrapping and propping proved that wrapping and propping with bamboos was the best under garden and wet land conditions. An experiment was laid out during the years 1937-38 to 1939-40 with four different treatments. The yields are tabulated below:-

Treatment	Yield of cane in tons per acre (average for 3 years)
(a) Wrapping and propping with bamboos	40.01
(b) Wrapping and propping with wire	42.16
(c) Wrapping and stooping	38.02
(d) Partial trashing and stooking	36.79

The variety planted was J. 247, and the results noted above are definitely in favour of wrapping and propping.

At Gudiyattam a similar experiment was conducted during the years 1937-40. The results indicated that wrapping and propping with bamboos was found to be effective and economical

Swamp trials: A number of varieties including Co. 419 were.....

were
tried under swamp conditions where water was let into the field in August and the crop grew with a standing water of 1 to 1 ft. depth till November. Co. 419 was the outstandingly the best variety even under ill-drained conditions, as also under drought conditions. The varieties mature earlier under swamp condition by about a month and the juices are richer but the tonnages are poorer than these obtaining under normal conditions of growth.

Seed rate: In the beginning when Coimbatore seedlings were not received usually a heavy seed rate ranging from 30,000 to 40,000 setts, per acre, was used for having good stand of crop as the varieties tried than had very poor germination. With the introduction of Coimbatore seedling canes which are capable of giving high germination percentage, and which are ~~capable of giving,~~ hi very vigorous in growth, the seed rate has been considerably reduced. To find out the optimum ~~xxx~~ seed rate for sugarcane an experiment was laid out during the years 1933-34 to 1935-36, with variety J-247, and another experiment during the years 1936-37 to 1938-39 with Co. 419. The different seed rates used in both the experiments were 12,000, 16,000, 20,000 and 24,000 three budded setts per acre. The results indicated that there was not much difference in yield under different treatments. Hence 12,000 to 16,000 sets per acre will be sufficient to plant an acre in this locality to get normal yield

Ratooning: Ratooning is one of the important problems in the cultivation of sugarcane. It is very common that ryots ratoon the cane crop for one or two seasons. An experiment to study the rationing capacity of a few promising varieties was laid out at Anakapalle during the years 1939-40 to 1941-42 with varieties of Co. 419, Co. 421 Co. 508 and POJ 2878. The results are tabulated below:

		Yield of cane in tons per acre			
		Co. 419	Co. 421	Co. 508	POJ 2878
1939-40	Plant crop	49.67	38.60	37.42	31.62
1940-41	plant crop	45.19	35.43	29.34	29.93
	First ratoon	37.22	33.15	27.58	24.08
1941-42	Plant crop	48.09	36.88	30.49	29.54
	First ratoon	38.97	38.22	23.08	25.55
	Second ratoon	30.15	37.95	20.66	18.54
Average yield of plant crop, 1st ratoon, II ratoon for three years for each variety		39.0		28.55	24.75

The results indicated that (i) plant crops yielded better than first or second ratoon (ii) it was economic to ratoon only once (iii) Ratoons were richer and earlier to mature than plant crops.

At Gudiyattam an experiment was laid out to study the ratooning capacity of three varieties (viz.) Co. 213, Co. 214 and J 247. The results showed that Co. 213 was the best ratooner while J- 247 was a total failure. Ratoons mature earlier than plant crops and are generally richer, but are susceptible to diseases.

Time of planting of late varieties: The usual season for planting cane in these parts is February-March. Late varieties when planted in February-March and harvested after April have to stand on the field for 15 months, thereby increasing the cost of cultivation. In order to see if planting can be advantageously delayed up to May or June, so that ryots can have the benefit of taking a Navari (summer) crop of paddy or ragi before sugarcane from January to April. An experiment was laid out at Gudiyattam to test the above and plantings were done from March to June, with two varieties Co. 419 and Co. 411.

The results showed that for late plantings Co. 419 is the best variety and plantings in May give the highest yield (48.29 tons of cane and 5.44 tons of jaggery per acre). Crop planted in April also gave 19% higher yield of jaggery than a March planted crop. By the recommendation of planting into varieties in April-May Ryots ~~xxxxxx xxxx xx~~ can not only get increased yields than when planted in March but can also grow a grain crop of ragi or paddy during the Navari season (January to April). This will also solve the grow more food problem to a great extent.

During the period covered by the report, the most important development in sugarcane cultivation is marked by the phenominal spread of Co. 213, replacing the ~~x~~ exotic types, in the early stages, and latter the spread of Co 419. Other promising varieties Co. 449, Co. 467 and Co. 475 released during the latter years are slowly spreading in the districts. Among the cultural practices, line planting is almost the rule now, resulting in considerable reduction in seed rate from anything over 30,000 setts per acre to nearly 12 to 15,000 setts per acre. This practise has considerably facilitated the intercultural operations, chief of which is the earthing up of cane during the formitive stage, when manures are also applied. This practice has definite effect on tillering and rapid growth during the grand period. The manurial schedule recommended by the farms is 100 lbs. in the northern districts, and 200 lbs N in the ~~control~~ central and southern districts. The researches during the last one decade have also indicated that the growth of cane is vigorous in the northern group of districts, but juice is richer and varieties ripening earlier in the ~~xxxxxx~~ central districts.

The overall improvement effected during the period can be judged by the increases in the area under sugarcane in the number of sugar factories installed and in the tonnage harvested per acre.

The cultivation of exotic types in the twenties of this century had many limitations. The varieties could thrive and yield only under liberal conditions of manuring and irrigation. The introduction of Coimbatore seedling canes which are handier than the exotic ones has made cane cultivation possible even by an average ryot. This coupled with the protection given to the sugar industry by the Government has increased the acreage under cane. The spread of sugarcane cultivation in this province is also indicated by the number of sugar factories which have increased from 2 in 1931-32 to 11 factories in 1945-46.

Thus it may be pointed out that the sugarcane crop plays an important role in the economy of the agriculturist in the important cane growing tracts of the province. The work on sugarcane in this province was mainly confined to researches on the major problems in the farms and the development and propaganda have not so far been taken up. Hence the report under the item is nil except to mention the fact that a comprehensive scheme for development is under consideration. It may be concluded that research work done under the aegis of Indian Council of Agricultural Research and Indian Central Sugarcane Committee, have certainly largely benefitted the ryots - in that the sugarcane cultivation in this province is now more or less on a scientific basis.

The following are the list of publications made during the period:

(1) Performance of cane under restricted conditions of manuring and irrigation ; by Sri R. Vasudevarao and Sri A. Sankaram (Madras Agricultural Journal - Oct. 1947)

(2) Trial of sugarcane under swamp conditions by Sri M. Lakshmikantam (Madras Agricultural Journal - March-April 1945)

(3) Ratooning of cane in Madras by Sri R. Vasudevarao and M.Lakshmikantham (Madras Agricultural Journal - March 1946)

p.t.o.

(4) Pith in cane by Sri M. Lakshmikantham (Current Science - Oct. 1947)

(5) Growth and Development of sugarcane in relation to methods of preservation of setts - By Sri P. Seetaramaiah (Madras Agricultural Journal - March April 1948)

(6) Physiology of sugar production (By Sri S.V. Parthasarathy, Sri N.V. Mohanarao and Sri P. Seetaramaiah - sent for publication to Proceeding of Indian Acadamic Science)

(7) Sett roots in Sugarcane By Sri S.V. Parthasarathy and Sri B. Appaji Rao (Current science - April 1948)

(8) Improved sugarcane varieties for Vizag district by Sri S.V. Parthasarathy and Sri P. Seetharamiah sent for publication to Madras Information).

(9) A quantitative method of determining pith formation in sugarcane by Sri K. Venkata Raman and Sri C. Ekambaram (Madras Agricultural journal - Vol. 29 - 1941)

(10) Pith Development studies in sugarcane by Sri K. Vasudevarao and Sri C. Ekambaram (Madras Agricultural Journal - Vol. 33 - July 1943)

(11) Some aspects of ratooning in sugarcane by Sri C. Ekambaram (sent for publication to Madras Agricultural journal)

(12) Performance of sugarcane varieties at Gudiyattam by Sri C. Ekambaram (published in G.M.F. Journal - April 1948).

GOVERNMENT OF MADRAS
Development Department

Letter No.46962-A 11/48-3

From

The Secretary to Government,
Development Department

To

The Secretary to the Indian Central Sugar Committee,
New Delhi (with enclosures)

Dated Fort St. George the 7th June 1948.

Sir,

AGRICULTURE - Indian Central Sugar Committee - Resume of work carried out on sugarcane in Madras Province.

Your letter No.F. 91/48-10.52, dated 21-4-48

I am directed to forward herewith the resume of work on sugarcane carried out in Madras Province as requested in your letter cited. A resume of work done in connection with the Sugarcane Pests will follow.

2. I am to request that copies of the compilation of the works done on research and development of sugarcane

may kindly be supplied to this Government as soon as they become ready.

Yours faithfully.

Sd/ ** **

Secretary to Government.

Copy to Director of Agriculture

RESUME OF WORK DONE IN CANE ENTOMOLOGY IN THE MADRAS PRESIDENCY 1942-48.

The sugarcane crop is subject to the attack of ~~varying~~ various pests, of which the stem borer is the most harmful in this Presidency. Since June 1942, under the aegis of the Indian Council of Agricultural Research, study of the biology and control of sugarcane pests has been in progress under the two heads (i) experiments on pest control on a field scale with the egg parasite Trichogramma and (ii) certain other work in connection with cane pests. Upto March 1945, the control of pest was purely ~~kix~~ biological and from 1946 onwards insecticidal and cultural treatments to control borers have been under study. The biological control is studied at Nellipuppam and the pest is studied at Coimbatore.

Trichogramma experiments: There are three different stem borers: viz. (i) early sheet borer Argyria (ii) the internode borer Diatraea and (iii) the top sheet borer Scrpophaga. The first mentioned one is the most important one of the tract. ~~The~~ It attacks the central sheet as well as the later formed tillers thus reducing the cane population in the field. Trichogramma evanescons, minutum, Riley is a naturally existing parasite on the eggs of the cane early sheet borer and experiments were conducted at Nellilippam to study if artificial liberation of the parasite on a large scale will reduce the borer population. Trichogramma parasites were bred at Coimbatore on the alternate host 'Cereyra' which is a stored product post. Liberation of 16,000 parasites per acre, soon after completion of germination and 12 weekly liberations were found best and adopted in the experiments since 1946

From the egg examination of borers, it was found that Argyria are predominant from planting to about 3 months, after which they decline and disappear; Diatraea appears in the field from June-July and continues upto harvest of the crop.

Liberation of parasites in the field revealed higher parasitisation of the pest than what is existent under natural conditions. In general it can be said that high parasitisation brings down the barer incidence and population. Though it cannot be said that the liberated plots show higher number of cases per acre at the time of harvest than those found in control plots, it can be said that the liberated plots contain more primary canes. The plots in which parasites were liberated showed higher average ~~acreage~~ yields as shown below.

Year	Average extra yield per acre over control
1943-44	10.36 Tons
1944-45	7.56 "
1945-46	5.30 "
1946-47	3.80 " (abnormal year)
1947-48	2.78 "

The cost of production of Trichogramma comes to about Rs.2/- per liberation per acre or Rs.24/ for twelve liberations.

Studies in pest: These investigations were carried out at Coimbatore. The experience of last five years shows that ~~xg~~ Argyria Strictieraspis and Diatraea Venesata are the major pests at Coimbatore while Solrpophago occupies a secondary rank. Argyria appears along with the germination of cane and continues till June-July. The infestation decreases with growth of the crop. Diatraea is a post of well formed cane and they appear in June-July and reach the peak by September-December. The Caterpillars bore into tissues of cane and cause deterioration in cane.

The infestation of Argyria was studied in three varieties Co. 419, Co. 421 and Co. 413 for the three growth periods (1) May-July, (2) August-November, (3) December-February. The pest is generally most serious during the first period and slackens later. Diatraea is most serious between August-November with progressive increase in infestation and population. There is no definite relationship between the infestation and population in the case of Argyria. For Argyria, high temperature with low Diatraea. while they are more or less parallel in the

humidity with few sharp showers in summer months seem congenial; while for Diatreea low temperature and high ~~x~~ humidity with few sharp showers in summer months seem congenial; while for Diatreea low temperature and high humidity with sparse rainfall seem congenial. Scirpophasa se incidence was always negligible. Of the three varieties studied Co. 419 is more susceptible to borers than the other two varieties.

Microclimatic studies within the three varieties of cane revealed no difference in the factors and as such no correlation between microclimatic factors and varietal susceptibility was possible.

The mortality of tillers of cane crop was due to Argyria, scirpophaga, wilting, ill-development and jackal bite. The average number of tillers was 4 to 9 and the average survival was 1 to 2. Loss in yield and sugar are under study.

The following plants were examined for the presence of borers and for the possibility of their being alternate hosts:

i. Saccharum spontanoum
ii. Pennisetum Hebenackeri.
iii. Arunde denay
iv. Echinechica crusgalli
~~v.~~
v. E. Stagnina
vi. Dichanthium annulatum

The first two mentioned plants showed stray or insignificant attacks by the two borers.

Eggs of Argyria and Diatreea were found parasitised by Trichogramma and Telonomeus. The caterpillars of the borers were parasitised by Apantoles flavipes, Rhaconotous schirpophagoe and Elasmus zehntnori, were bred from Scirpophaga caterpillars and Ruaconotous reslinensie from Diatreea larvae caterpillars and Ruaconotous reslinensic from Diatreea larvae.

Earthing up the seedling in the early stages did not reveal any difference in 1946-47, but in 1947-48 the earthed up plots gave 7.45 per cent higher tonnage than control.

D.D.T and Gommaxano were dusted in two strengths, ~~50~~ 5 % per ~~xx~~ cent and 2½ per cent and dusted once or twice. Treated plots showed lower infestation but the yield differences were not significant. When the insecticides were applied as 0.25 per cent water suspension, D.D.T was more effective than Gommaxane in reducing deadhearts, but yield differences were not much.

Digging the canes to below ground level and harvesting the underground portions, were tried in order to remove all crop resudues at harvest and to prevent breeding of borers. Though there is a profit of about Rs.20/- per acre, the non-availability of extra labour, especially during general harvest season, sets a limitation to the adoptation of this in practice.

GOVERNMENT OF MADRAS
Development Department

Letter No.46962-Ai1/48-4

From

The Secretary to Government,
Development

To

The Secretary to the Indian Central Sugar Committee,
New Delhi

Dated Fort St. George the 12th June 1948.

Sir,

Sub: Agriculture - Indian Central Sugar Committee - Resume of work carried out in connection with the Sugarcane pests in Madras Province.

Your letter No.F. 91/48-1052, dated 21-4-48

In continuation of this Government's letter No.46962-Ai1/48-3, dated 7-6-48, I am directed to forward herewith the resume of work done in connection with sugarcane pests in Madras Province.

Yours faithfully,
Sd/ ** **
Secretary to Government.

Copy to the Director of Agriculture.

p.t.o.

Development Department.

To A.S.

(Indian Central Sugar Committee's letter on p.31 above).

The papers may be recorded with a call book entry against 10-1-49 to watch the reply of the Indian Central Sugar Committee to para 2 of the letter on p.22 above.

** **

5-7-48.

G.O.Ms.No.3606 Development dated 7-7-48.

AGRICULTURE Indian Central Sugar Committee - Resume of work carried out on sugarcane in Madras Province - Forwarded to the Committee - Papers - Recorded.

(True copy)

R. Thiagarajan 9.2.5-4

Office Assistant,
Madras Record Office.

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